



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,733	04/16/2004	Masataka Shinoda	075834.00485	1364

33448 7590 05/12/2008

ROBERT J. DEPKE
LEWIS T. STEADMAN
ROCKEY, DEPKE & LYONS, LLC
SUITE 5450 SEARS TOWER
CHICAGO, IL 60606-6306

EXAMINER

GOMA, TAWFIK A

ART UNIT	PAPER NUMBER
----------	--------------

2627

MAIL DATE	DELIVERY MODE
-----------	---------------

05/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/826,733	Applicant(s) SHINODA, MASATAKA	
	Examiner TAWFIK GOMA	Art Unit 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,8,9,12,13,16-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,8,9,12,13 and 16-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to the amendment filed on 2/10/2008.

Claim Rejections - 35 USC § 112

Claims 16 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claims include the limitation that the objective lens *is* a solid immersion lens (SIL) shaped like a conical lens. Applicant's written description, however, only indicate that the objective lens being referred to in the claims (one having an NA greater than 1) is in fact a combination of two lenses, lens 21 and 22, when an SIL is in use (par. 58) such that lens 21 is the lens shaped in a conical shape (see pars. 80, and 75). Nowhere does the description show an objective lens made only of a single conical SIL lens having a numerical aperture greater than 1. Applicant's disclosure of an objective lens 4, is not a disclosure of an *SIL lens* as an objective lens formed in a conical shape, and applicant's disclosure shows that compound lenses are used with an SIL type (par. 58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 5, 8-9, 12-13, 16-17 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knight et al (US 6243350) in view of Okubo (US 2003/0118936) and further in view of Nagoya et al (US 2003/0048740).

Regarding claim 1, Knight discloses an optical recording system including a recoding/reproducing optical head having an objective lens (fig. 30b) and an optical recording medium recorded and reproduced with irradiation of light thereon from said optical head, said irradiation of light being made by an objective lens of which numerical aperture is larger than 1 (col. 35 lines 57-63, $NA = NA \text{ of Objective lens } (.65) \times \text{Refractive index of SIL } (2) = 1.3$), said optical recording medium comprising at least a silicon oxide layer and a recording layer being formed over a substrate, in that order (col. 37 line 12). Knight further discloses wherein said recording layer has formed thereon a protective layer of which refractive index is larger than a numerical aperture of said objective lens (SiN, col. 37 line 12 and lines 3-6). Although Knight discloses that the any write-once, or phase change material can be used as the recording layer, he fails to disclose a silicon recording layer. In the same field of endeavor, Okubo discloses a recording medium with a silicon recording layer (par. 83). It would have been obvious to one of ordinary skill in the art to use a silicon recording layer as taught by Okubo in the recording medium taught by Knight. The rationale is as follows: One of ordinary skill in the art would have been motivated to use a silicon recording layer as a suitable write-once recording material since Knight (col. 29 lines 44-67) suggests using any suitable write-once recording material and Okubo teaches that silicon is a suitable write-once material.

Further regarding claim 1, Knight in view of Okubo fail to disclose an optical radiation source for emitting light having a wavelength of between 300 nm and 500 num, and that the

Art Unit: 2627

numerical aperture of the objective lens is larger than 1 when irradiated with a wavelength of substantially 400 nm. In the same field of endeavor, Nagoya discloses a light having a wavelength of 405 nm and an objective lens which has a NA of greater than 1 used with that light (par. 170). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to use a light of 405 nm with an NA greater than 1. The rationale is as follows: One of ordinary skill in the art would have been motivated to use a light of 405 nm in order to increase the recording density of the disc.

Regarding claim 2, Knight in view of Okubo and Nagoya disclose everything claimed as applied above. Further in regard to claim 2, it is known that an inherent property of silicon is that it is oxidized when irradiated by a recording laser, and pits are formed by changing silicon to silicon-oxide by the recording laser.

Regarding claim 5, claim 5 is rejected for the same reasons as claims 1 and 2 above.

Regarding claims 8 and 9, Knight further discloses wherein the recording layer and the protective layer each have a refractive index greater than the numerical aperture of the objective lens (col. 35 lines 65-67). Furthermore, in the combination of Knight and Okubo, a silicon recording layer is provided as a recording layer and an SiN protective layer of Knight is used as the protective layer. Okubo further discloses wherein the silicon recording layer and an SiN layer have a refractive index that would be much greater than the numerical aperture of the objective lens when irradiated with a wavelength of substantially 400 nm (Table 1, page 6 and par. 91).

Regarding claims 12 and 13, Okubo further discloses wherein the refractive index of the silicon recording layer is up to 3.9 but fails to disclose wherein the refractive index is greater

Art Unit: 2627

than 4 (Table 1, page 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a refractive index of greater than 4. The motivation would have been: To apply a silicon recording layer with a refractive index greater than 4 as opposed to 3.9 in the course of routine engineering optimization/experimentation. Moreover, absent a showing of criticality, i.e., unobvious or unexpected results, the relationships set forth in claims 12-13, the limitations are considered to be within the level of ordinary skill in the art.

Additionally, the law is replete with cases in which the mere difference between the claimed invention and the prior art is some range, variable or other dimensional limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range(s); see *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, the instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions; see *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

Regarding claims 16 and 17, the claims are interpreted in view of the 112 1st rejection as applied above. Knight further discloses wherein said objective lens is a solid immersion lens (SIL) shaped like a conical surface (figs. 6 and 7).

Regarding claims 22 and 23, Knight further discloses the limitations of claim 1 wherein the objective lens is defined as the single lens of the optical head closest to the optical recording

Art Unit: 2627

medium (SIL, col. 35 lines 61-65). The SIL of Knight has a refractive index of 2.00, and the NA of a lens is calculated as $n \cdot \sin \theta$ (n being the refractive index of the material). Therefore, the maximum possible NA of the single SIL lens of Knight is found at $\theta = 90^\circ$, resulting in an $NA = n = 2$ for Knight's lens. This NA is less than the refractive index of the protective layer (SiN = 2.07) disclosed by Knight.

Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knight et al (US 6243350) in view of Okubo (US 2003/0118936) and Nagoya et al (US 2003/0048740) and further in view of Ueyanagi (US 6704250).

Regarding claims 18 and 19, Knight further discloses wherein the objective lens includes an SIL (3012, fig. 30b), but fails to disclose wherein the SIL has a main component material selected from the group consisting of SrTiO_3 , $\text{Bi}_4\text{Ge}_2\text{O}_{12}$, and $\text{Bi}_4\text{Ge}_3\text{O}_{12}$. In the same field of endeavor, Ueyanagi discloses a condensing medium with a main component material SrTiO_3 (col. 6 lines 34-38 and). It would have been obvious to one of ordinary skill in the art to provide an SIL disclosed by Knight with a main component material of SrTiO_3 . The rationale is as follows: One of ordinary skill in the art at the time of the applicant's invention would have provided an SIL with a main material component of SrTiO_3 as a simple substitution of one known element for another known element in the art which would yield predictable results.

Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knight et al (US 6243350) in view of Okubo (US 2003/0118936) and Nagoya et al (US 2003/0048740) and further in view of Yamada et al (US 5024927).

Regarding claims 20 and 21, Knight in view of Okubo and Nagoya disclose a recording medium with a substrate, a reflection film, a silicon oxide layer, a silicon recording layer and an

Art Unit: 2627

SiN protective layer as applied in the combination above. Knight in view of Okubo and Nagoya fail to disclose wherein the silicon oxide layer is formed directly on the substrate. In the same field of endeavor, Yamada discloses providing a recording medium with a substrate, a silicon oxide layer formed directly on the substrate (2, fig. 2), a recording layer formed directly on the silicon oxide layer (3, fig. 2), and a protective layer formed directly on the recording layer (4, fig. 2). It would have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the medium disclosed by Knight in view of Okubo and Nagoya by eliminating the reflective layer as in Yamada. The rationale is as follows: One of ordinary skill in the art at the time of the applicant's invention would have eliminated the reflective layer in order as a simple substitution of one known element for another which would obtain predictable results (see Yamada, col. 9 lines 45-51).

Response to Arguments

Applicant's arguments filed 2/01/2008 have been fully considered but they are not persuasive.

Applicant's arguments with respect to claims 1, 5, 12, 13, 18 and 19 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments with respect to claims 8 and 9 are not persuasive because the combination of Knight and Okubo discloses the use of a Silicon recording layer and a Silicon Nitride protective layer. Okubo also discloses that a property of the materials in the combination is that a refractive index of Silicon and Silicon Nitride at 400 nm are greater than the NA of the lens system of Knight.

Applicant's arguments with respect to claims 16 and 17 are not persuasive because the claims are not supported by the written description as discussed above. The claim recites that the objective lens is an SIL lens shaped like a conical surface, but the description only provides the use of two lenses when an SIL lens is applied. The disclosure does not describe the lens 4 as an SIL lens formed in a conical shape, and only describes it as an objective lens.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TAWFIK GOMA whose telephone number is (571)272-4206. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph H. Feild/
Supervisory Patent Examiner, Art Unit
2627

Application/Control Number: 10/826,733
Art Unit: 2627

Page 9

/Tawfik Goma/
Examiner, Art Unit 2627